Hydro Electronic Devices, Inc.

CANLink® Conductor™ USER'S MANUAL

V03

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FULL TEXT OF THE CANLink® Conductor™ LICENSE IS INCLUDED WITH THE SOFTWARE

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Safety Information

SOFTWARE USE PRECAUTIONS

This CANLink Conductor software is designed to be used in diagnostic troubleshooting of HED, Inc. installed CANLink module systems. Because this software can alter the settings of any of these modules, extreme caution should be taken to understand how module setting adjustments will impact operation of the Original Equipment Manufacturer's (OEM) product.

Users of this software should be fully authorized and trained in the use of the CANLink® Orchestra™ suite of software packages. The user should also have full working knowledge of the OEM product before making any troubleshooting adjustments with the Conductor software.

Death or serious injury may result from debugging and/or altering any *Data Item*. Users should also understand that adjustments made with this software could cause unexpected movement or other undesired results of the OEM's product.

DANGER
BEWARE, SERIOUS INJURY OR DEATH MAY RESULT FROM THE FOLLOWING:
1) DEBUGGING ANY DATA ITEM VALUE(S)
2) ALTERING ANY EEPROM OR TIMER VALUE(S)
3) MOVEMENT OF EQUIPMENT BY USE OF THIS TOOL.

WHEN DEBUG IS ACTIVATED, YOU ARE ASSUMING CONTROL OF SELECTED DATA ITEMS DIRECTLY AND POTENTIALLY BYPASSING SAFETY INTERLOCKS AND NORMAL OPERATION. THIS MAY RESULT IN SERIOUS INJURY OR DEATH TO YOU OR OTHERS IN THE VICINITY OF THE EQUIPMENT.

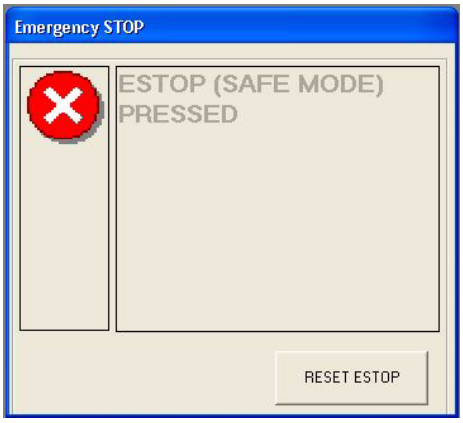
EMERGENCY STOP (E-STOP) - SAFE MODE

The *Emergency Stop (E-Stop) - Safe Mode* is a predetermined state defined by the OEM to ensure the product reacts predictably in the event of emergency. This *Safe Mode* state will put the OEM product into the safest configuration by turning selected *Outputs* either ON or OFF. It is suggested that you contact the OEM to understand how the product will behave once the *Safe Mode* is engaged.

At any time that the Conductor software is connected to an OEM product, the *Emergency Stop (E-STOP) - Safe Mode* can be activated one of two ways.

- Depressing the computer keyboard **"SPACEBAR"**
- Disconnecting the communication cable between the computer and the product Master Modul.

Upon entering the *Safe Mode,* the following screen will be displayed.



While in the *Safe Mode*, some *Data Items* configured for *Safe Mode* will not update. These *Data Items* are fixed until *Safe Mode* has been reset. Click "RESET ESTOP" to run the system back in normal mode. All *Data Items* will update periodically after resetting the *Safe Mode*.

General Information

SOFTWARE INSTALLATION

Refer to the CANLink® Orchestra™ Software Installation Manual for system requirements and for procedures on how to install the CANLink Conductor software.

MAIN WINDOW

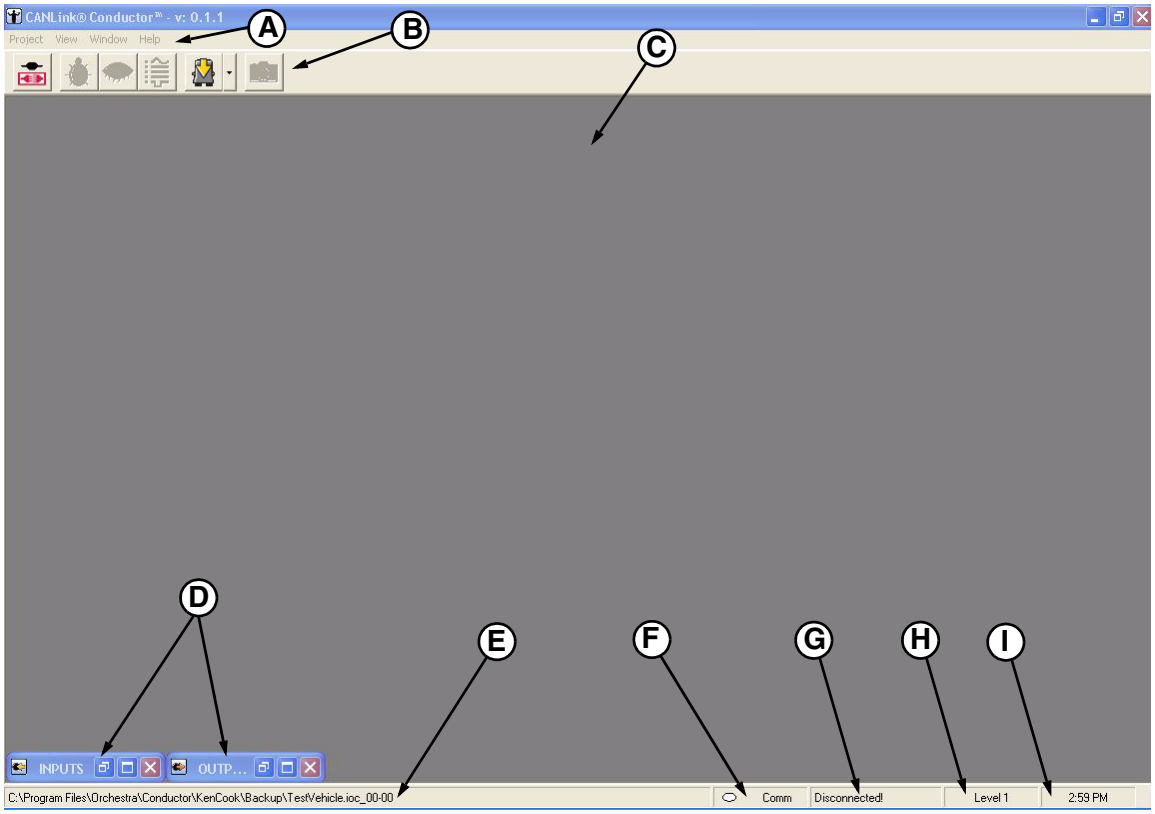


Figure 1

A. Program Menu
B. Tool Bar Buttons
C. Main Window
D. Minimized Windows
E. Opened Database Location
F. Communication Status
G. Connection Status
H. User Level Indicator
I. Active Time

Menus

Project Menu

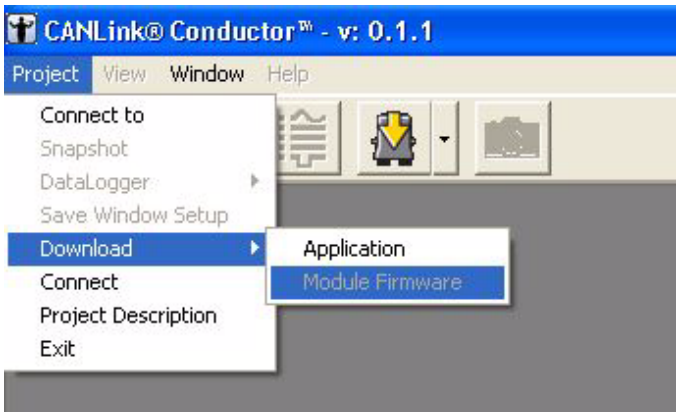


Figure 2

Use this function to **Connect to** a module using a specific communication port, **Download** - downloads **Application** software or **Module Firmware**, **Connect** or **Disconnect** from active modules, display the **Project Description** of a specific project or **Exit** the Conductor.

*Note: With this release of the Conductor software, the **Snapshot, Datalogger** and **Save Window Setup** menu choices are not active features at this time and will remain grayed out.*

View Menu

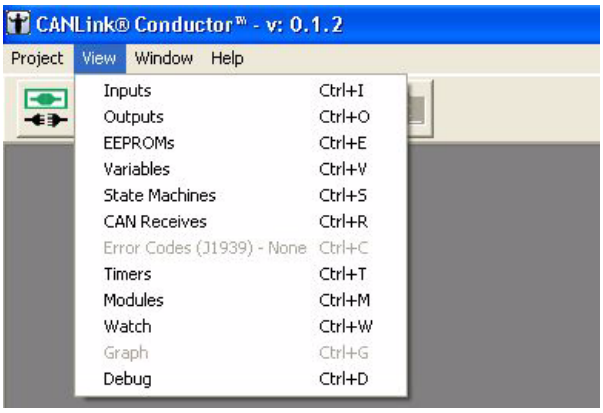


Figure 3

Use this function to open the following Conductor windows: **Inputs, Outputs, EEPROM, Variables, State Machines, CAN Receives, Timers, Modules, Watch** or **Debug**. If a *Data Item* type is not configured for this specific project, that *Data Item's* name will be grayed out.

*Note: With this release of the Conductor software, the **Error Codes** and **Graph** menu choices are not active features at this time and will remain grayed out.*

Window Menu

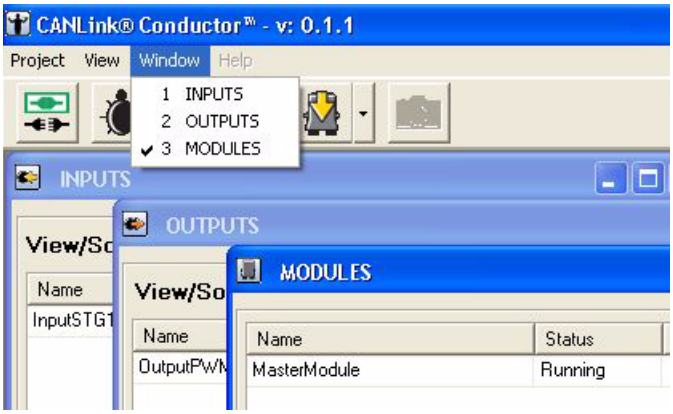


Figure 4

Use this function to pull the currently opened windows to the foreground.

Help Menu

Figure 5

Use this feature to find out about the Conductor or request a temporary license file.

Tool Bar Buttons

These buttons provide simple access to all major Conductor data windows and other Conductor functions.

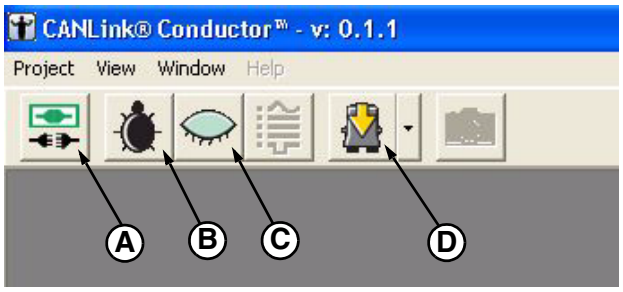


Figure 6

Note: With this release of the Conductor software, the View Graph Window button *and View Snapshot Window* button *are not active features and will remain grayed out.*

(A) Connect/Disconnect Button

Clicking this button will result in connection to or disconnection from the Master Module in the OEM product. The button will appear in two ways depending upon whether there is a communications link between the product and your computer. If the button appears as "Connected," click it to disconnect. Conversely, if the button appears as "Disconnected," you can click it to re-establish the connection. The button will display as follows:

Connected

Disconnected

(B) View Debug Window Button

Clicking this button will open the **Debug** window. The *Debug* button allows for direct control of *Inputs*, *Outputs* and *Variables* via the Conductor. Debugging is designed to aid in the troubleshooting of OEM product problems. A detailed description of how to use debugging is included later in this document. *See Debug on page 33*.

View Debug Window Off

View Debug Window On

C) View Watch Window Button

Clicking this button will open the **Watch** window. This button works best for large systems with many *Inputs*, *Outputs*, *Variables*, etc., where it is inconvenient to monitor several *Data Items* simultaneously within their respective data windows. *See Watch Window on page 29*.

View Watch Window Off

View Watch Window On

(D) Downloader Button

Clicking this button will open the CANLink® Downloader™ software. This will allow you to either download an existing Composer application or download new firmware to a Master Module.

Licensing

DONGLE

A dongle is required for the Conductor to operate in normal mode. If the dongle is lost or damaged, a temporary license file can be requested by clicking *Help>Request Temp License File* menu option from the **Main** window. This will create a file called *HEDLicenseFile.dat*.

HEDLicenseFile.dat must be sent to HED where it will be read and a file called *LicenseRequest.dat* will be created and sent to you. *LicenseRequest.dat* must be placed in the Conductor installation path.

If no dongle or license request file is present, the Conductor will run in **** DEMO MODE **** or **** READ ONLY MODE **** with limited capabilities.

ACCESS LEVELS AND PASSWORD

Access Levels

Access levels to features in the Conductor are controlled by your OEM supplied password. Different access levels allow different level users to use some or all features of the Conductor. Based on your access level, some features described in this manual may not be available.

Password

The Conductor password is supplied by the OEM. The password is case-sensitive. The password determines your level of access to some or all features of the Conductor. Contact your OEM if you feel that you require a different level of access to other features of the Conductor.

Quick Start

GENERAL INFORMATION

This guide will outline the steps needed to quick launch the Conductor. This assumes that the Master Module has been programmed with the appropriate firmware and that all connections to the module have been made and that the module is powered. A dongle or temporary license file is also required for the Conductor to operate.

GETTING STARTED

1. Open the Conductor.

Click *Start>Programs>Orchestra>Conductor* **(Figure 1)**.

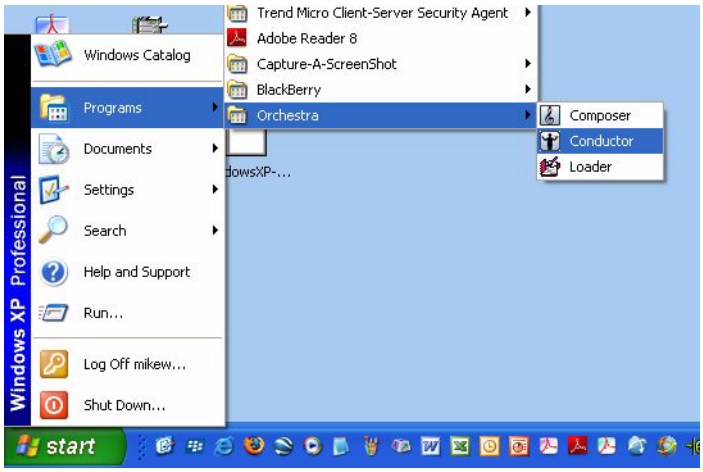


Figure 1

2. The first screen to display will be the Conductor splash screen **(Figure 2)**. The equipment OEM may configure their logo on this screen. The version of the Conductor software can be viewed on this screen. The Conductor **Main** window will then open.

Figure 2

3. Click the *Connect/Disconnect* button. The **Open** window **(Figure 3)** will display.

Note: In order to run the Conductor, a file specific to your equipment is required. This file will be an .IOc_XX_YY (where XX and YY are used for designating revision) type file and should be obtained from the OEM. If an invalid file is selected, no connection will be made and a prompt will warn of invalid file selection.

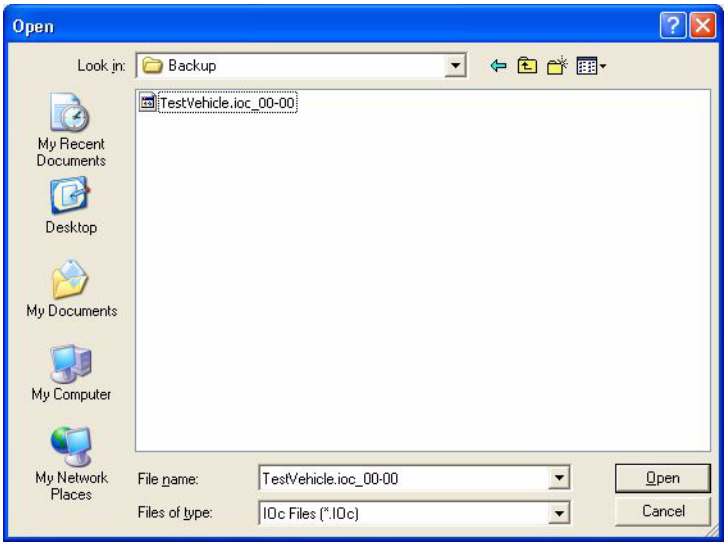


Figure 3

4. Select the .IOc_XX_YY file supplied by the OEM and click *Open*.

Note: If a dongle is not connected, a No Dongle Found message will appear **(Figure 4)**. *Connect a dongle to an available USB port and click OK. If a second attempt is made to connect without a dongle, the Conductor will open on the next try in *** DEMO MODE *** with limited capabilities.*

Figure 4

5. After the dongle has been installed and the proper .IOc file has been selected, you will be prompted for a password **(Figure 5)**. Enter the password that was supplied to you by the OEM. The password is case-sensitive.

*Note: If an incorrect password is entered three consecutive times, the Conductor will default to a *** READ ONLY MODE *** where you can observe the status of Inputs and Outputs etc., but you cannot debug them.*

Figure 5

6. You can also enter the *** READ ONLY MODE *** **(Figure 6)** by simply clicking *Cancel* when prompted for a password. Once a valid password is entered or *Cancel* is clicked, and a proper connection is made between your computer and the OEM product, the Conductor will be connected. A proper connection can be verified by looking at the *Connect/Disconnect* button on the Conductor's main toolbar or by observing the red flashing Comm cell icon **(Figure 7)** in the status bar at the bottom of the **Main** window.

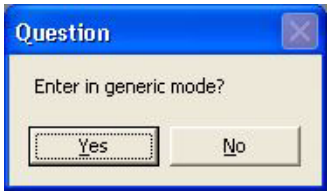


Figure 6

7. After successful connection to the OEM product, the **Main** window will display a similar window example as shown **(Figure 7)** (configured default windows may be different).

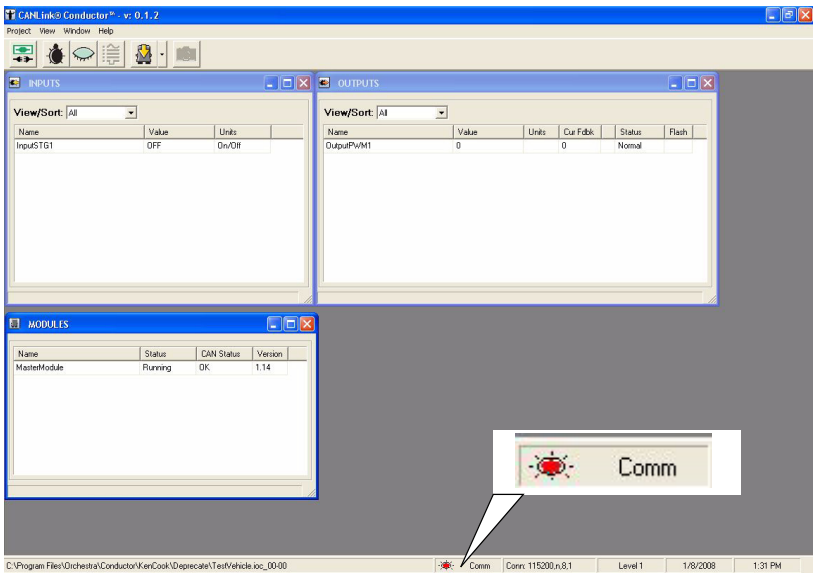


Figure 7

8. The Conductor is ready for use at this time.

Data Windows

MODULES WINDOW

Description

The **Modules** window **(Figure 1)** includes all CANLink modules on your OEM product.The *Name*, *Status*, *CAN Status* and *Version* can be observed from this window.

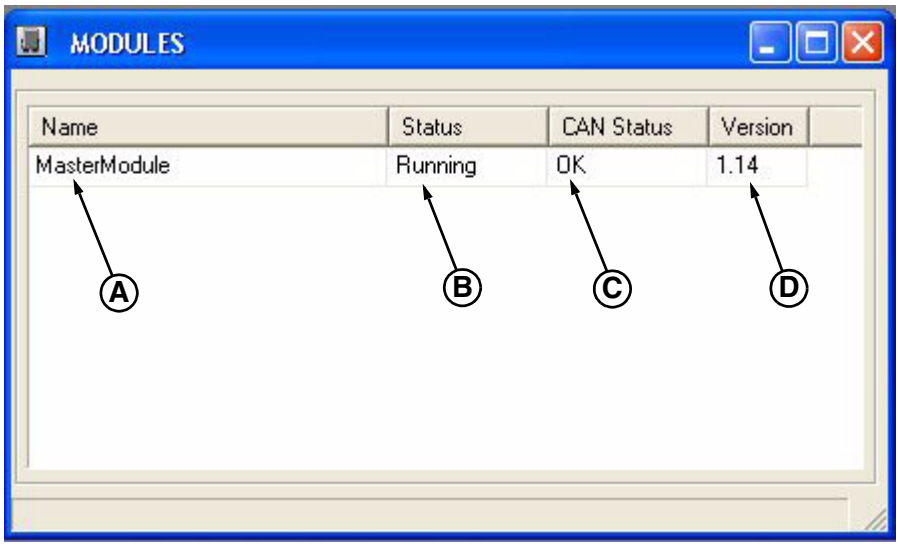


Figure 1

(A) Name

Each module is given a name by the OEM and appears in this column.

(B) Status

- **Running:** module is communicating correctly
- **Missing:** there is a communication problem with the module
- **Needs Config:** error, contact OEM
- **Needs Assign:** error, contact OEM
- **Wake up:** error, contact OEM
- **Comm Fail:** error, contact OEM
- **Soft Reset:** error, contact OEM
- **In Stub:** error, contact OEM
- **Unknown:** module may be “Missing”

Note: Viewing a module’s status is the best starting point when troubleshooting a system problem. If a module is “Missing,” all of its Inputs and Outputs will not be contributing to the control of the system. Ensuring proper communications between all system members is an imperative first step (check wiring and power).

(C) CAN Status

- **OK:** system is communicating correctly
- **CAN1 Bad:** Dual CAN system only, utilizing the second CAN bus (CAN2), CAN1 is not functioning properly
- **CAN2 Bad:** Dual CAN system only, utilizing the first CAN bus (CAN1), CAN2 is not functioning properly
- **Unknown:** status unknown, module may be “Missing”

(D) Version

Each module’s firmware is identified with a version number by the OEM and appears in this column.

INPUTS WINDOW

Description

The **Inputs** window **(Figure 2)** contains all the connected CANLink module *Inputs* for the OEM product. Within the **Inputs** window, the *Name*, *Value* and *Units* can be observed. Also, there are two pull-down menus to the right of the **View/Sort** label at the top on the **Inputs** window.

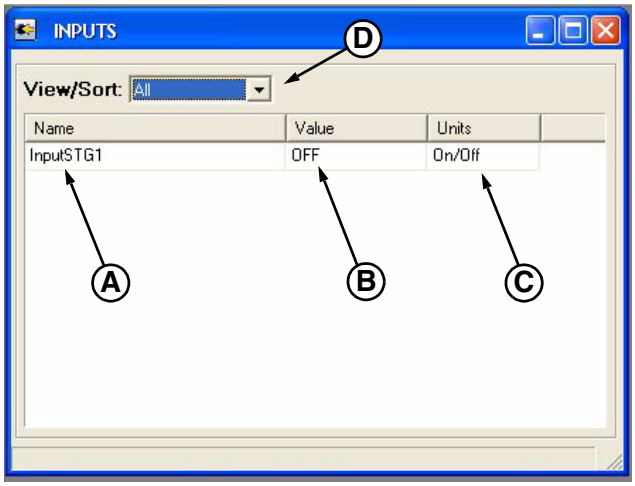


Figure 2

(A) Name

Each *Input* is given a name by the OEM and appears in this column.

(B) Value

In this column, the values of all *Inputs* will be displayed. It will either be a numeric value for analog inputs, or ON or OFF for digital inputs.

(C) Units

Indicates how to interpret numeric values.

(D) View/Sort

If your equipment has many *Inputs*, such that they cannot all be viewed in the **Inputs** window at once, you can use the **View/Sort** dropdown menus to view *Inputs* in two convenient ways (besides viewing them all).

One way is to **View/Sort** out all *Inputs* for a given module on the system. To do this, first pull down on the left dropdown menu (which defaults to *All*) and select *Module*. Then, pull down on the other menu and select the Master Module of interest **(Figure 3)**. At that point, all the *Inputs* for that module only will appear in the **Inputs** window.

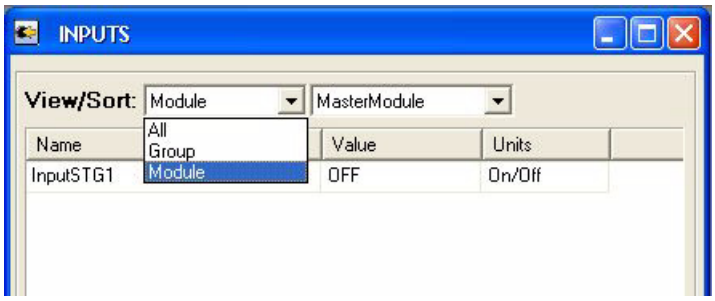


Figure 3

The other way to **View/Sort** is by predetermined groups. To do this, pull down on the left dropdown and select *Group*. Then, pull down on the right dropdown menu and select a group type **(Figure 4)**. Your OEM predetermines the types of groups and which *Inputs* are listed within a group.

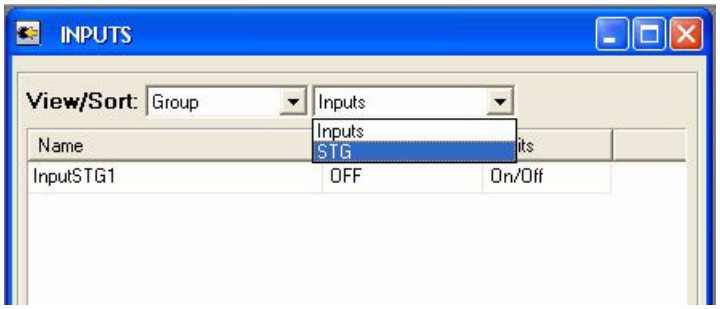


Figure 4

(E) Pinout Information

Pinout information can be obtained for any input by double-clicking on the *Input* name. A separate window will appear **(Figure 5)** showing pinout information.

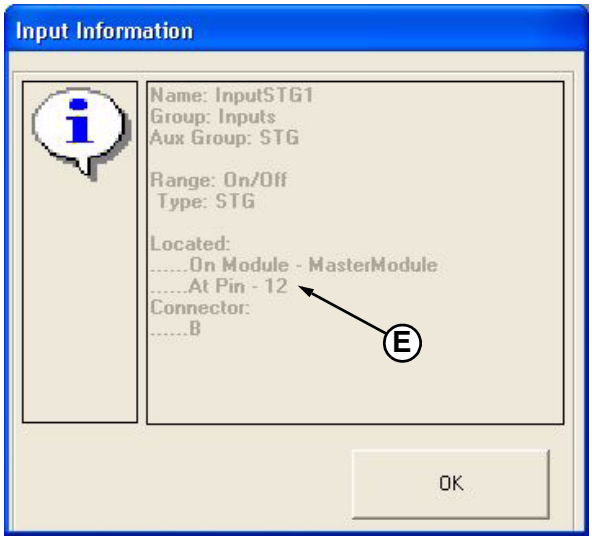


Figure 5

OUTPUTS WINDOW

Description

The **Outputs** window **(Figure 6)** has within it all the connected CANLink module *Outputs* for the OEM product. It does NOT include *Outputs* from other devices not controlled by a CANLink module. For all *Outputs* listed within the **Outputs** window, the *Name*, *Value*, and *Units* can be observed. In addition, *Current Feedback* and/or *Status* and/or *Flash* status may be observed if the hardware in the module supports it. There are two dropdown menus to the right of the **View/Sort** label at the top of the **Outputs** window, used for sorting.

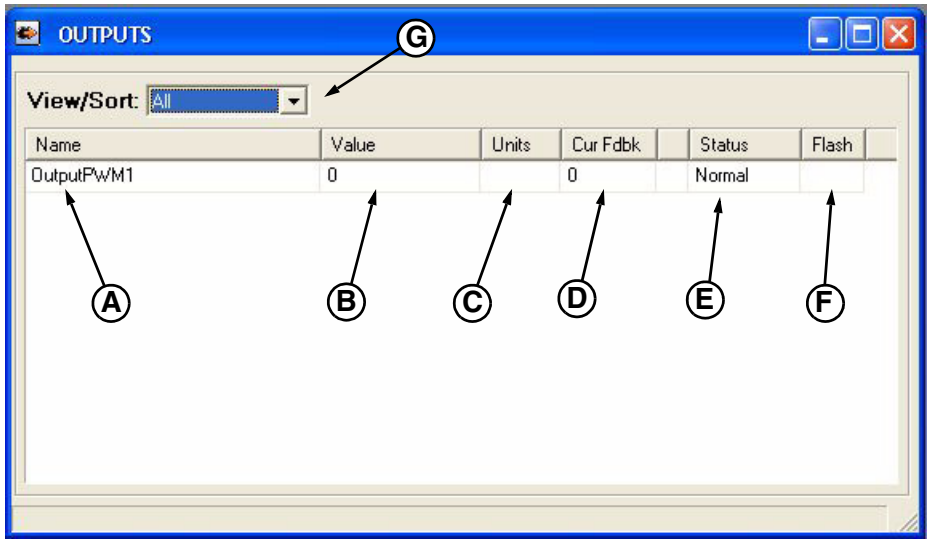


Figure 6

(A) Name

Each *Output* is given a name by the OEM and appears in this column.

(B) Value

- **On/Off:** If an *Output* is digital, it will show either ON or OFF depending on its state.
- **PWM Duty Cycle:** The value commanded is a percentage ranging from 0% to 100%.
- **Constant Current:** The value commanded is a current value in mA.

(C) Units

Used to give meaning to the values in the *Values* column.

(D) Current Feedback (Cur Fdbk)

This column displays the current through the output, given in mA.

(E) Status

The status shows how a particular *Output* "appears" to the module it is on.

- **Normal:** *Output* attached to normal load
- **Open:** no load attached to *Output*
- **Short GND:** *Output* shorted to ground
- **Short BATT:** *Output* shorted to battery
- **OverCurrent:** load attached to *Output* is drawing excess current
- **Grounded:** servo on *Output* is shorted to ground
- **STB or Open:** *Output* is shorted to battery or open, undetermined
- **Under/Over Volt:** voltage supplied to *Output* is either above or below required voltage
- **Over Temp:** *Output* is drawing excess current
- **STG or Open:** *Output* is shorted to ground or open, undetermined

(F) Flash

Output Flashing is a means of commanding an *Output* to turn on and off automatically. If *Flash* is enabled, it will display "On" in this column.

(G) View/Sort

See (D) View/Sort on page 12 for example.

(H) Pinout Information

Pinout information can be obtained for any *Output* by double-clicking on the *Output* name. A separate window will appear **(Figure 7)** showing pinout information.

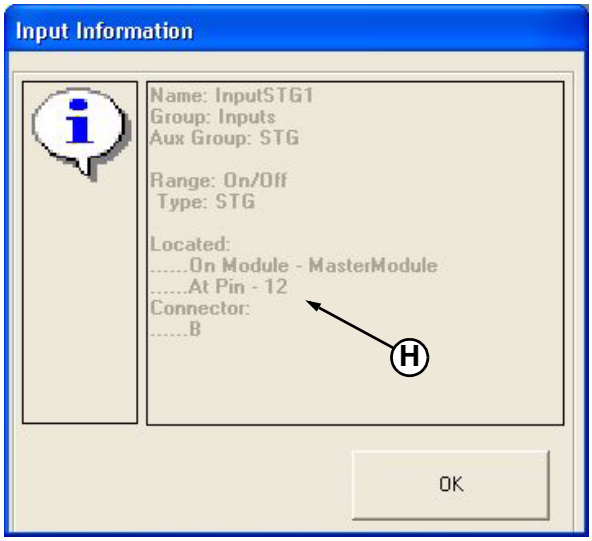


Figure 7

VARIABLES WINDOW

Description

The **Variables** window **(Figure 8)** is where all the module's variable information can be displayed. For all *Variables* listed within the **Variables** window, the *Name*, *Value* and *Units* can be observed. Also, there are two dropdown menus to the right of the **View/Sort** label at the top on the **Variables** window, used for sorting.

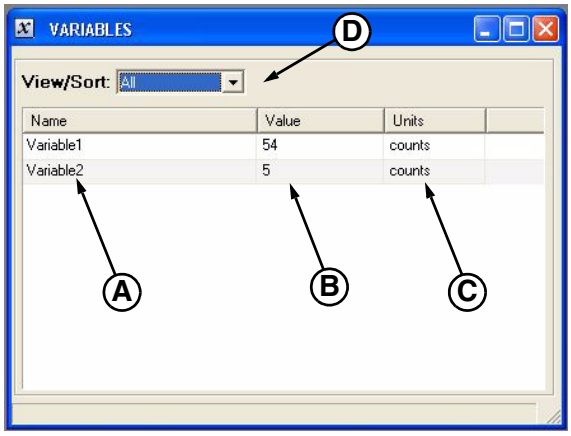


Figure 8

(A) Name

Each *Variable* is given a name by the OEM and appears in this column.

(B) Value

- **Digital:** ON or OFF
- **Other:** Various numeric values

(C) Units

Used to give meaning to the values in the *Values* column.

(D) View/Sort

See (D) View/Sort on page 12 for example (exception being that *Variables* cannot be sorted by Module, just Group).

(E) Variables Information

Variables information can be obtained by double-clicking on the *Variable* name. A separate information window will appear **(Figure 9)**.

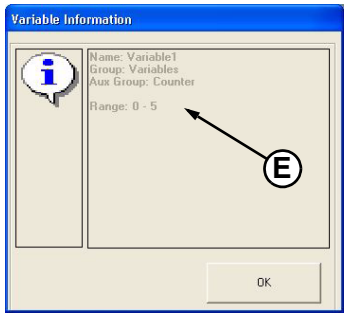


Figure 9

STATE MACHINES WINDOW

Description

The **State Machines** window **(Figure 10)** will display the current value for the *State Machines*. For all *State Machines* listed within the **State Machines** window, the *Name and Value* can be observed. Also, there are two dropdown menus to the right of the **View/Sort** label at the top on the **State Machines** window, used for sorting.

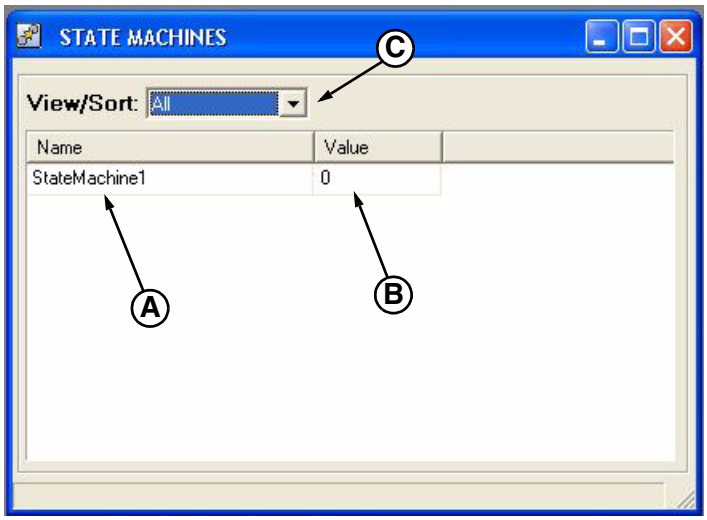


Figure 10

(A) Name

Each *State Machine* is given a name by the OEM and appears in this column.

(B) Value

- Number Range from 0 - 255
- **Other:** An enumeration of a specifically named value.

(C) View/Sort

See (D) View/Sort on page 12 for example (exception being that *State Machines* cannot be sorted by Module, just Group).

(D) State Machines Information

*State Machine*s information can be obtained by double-clicking on the *State Machines* name. A separate information window will appear **(Figure 11)**.

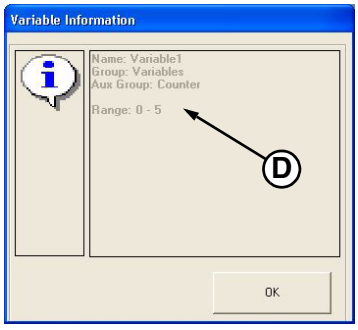


Figure 11

CAN RECEIVES WINDOW

Description

The **CAN Receives** window **(Figure 12)** shows the current value received from a CAN message. For all *CAN Receives* listed within the **CAN Receives** window, the *Name*, *Value*, *Units and Status* can be observed. There are two dropdown menus to the right of the **View/Sort** label at the top on the **CAN Receives** window, used for sorting.

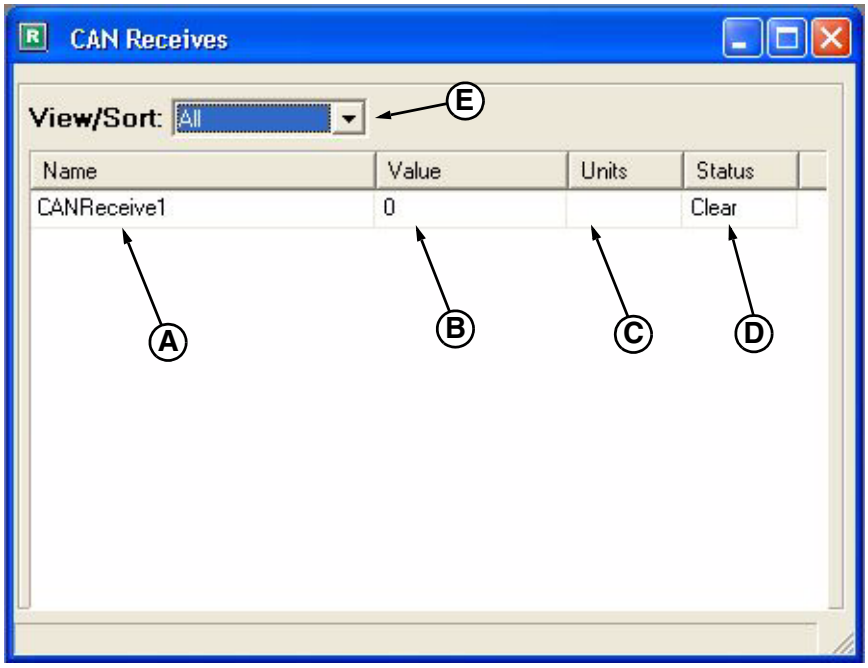


Figure 12

(A) Name

Each *CAN Receive* is given a name by the OEM and appears in this column.

(B) Value

Number Range from 0 - 4294967294

(C) Units

Used to give meaning to the values in the *Values* column.

(D) Status

The status shows if a *CAN Receives* message has been *Cleared* or *Received*.

(E) View/Sort

See (D) View/Sort on page 12 for example (exception being that *CAN Receives* cannot be sorted by Module, just Group).

TIMERS WINDOW

Description

When the **Timers** function is selected, two separate windows will open. The **Danger** window **(Figure 13)** and the main **Timers** window **(Figure 14)**.

DANGER
BEWARE, SERIOUS INJURY OR DEATH MAY RESULT FROM THE FOLLOWING:
1) DEBUGGING ANY DATA ITEM VALUE(S)
2) ALTERING ANY EEPROM OR TIMER VALUE(S)
3) MOVEMENT OF EQUIPMENT BY USE OF THIS TOOL.

Figure 13

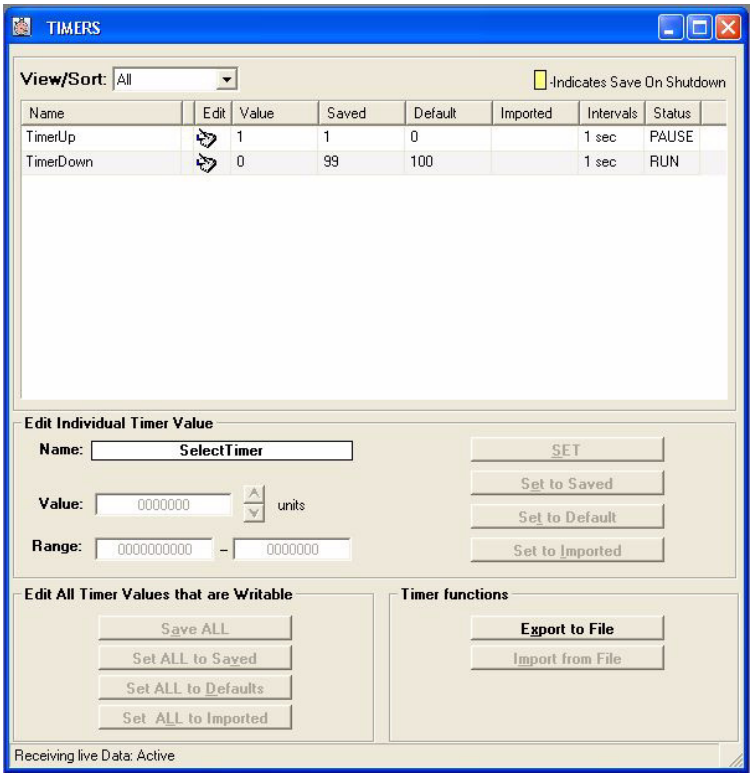


Figure 14

⚠ WARNING

MASTER MODULE OVERRIDE HAZARD

Whenever Timers values are changed, the functionality of the system may be affected. Entering a wrong value may cause unpredictable OEM product behavior. Death or serious injury can result.

Timers Window Features

View Timers

This part of the **Timers** window **(Figure 15)** lists nine columns *(Name, Save On Shutdown indication, Edit*, *Value*, *Saved*, *Default, Imported, Intervals* and *Status)* of *Timer* settings installed on the OEM product. The *Value* column is the only column that can be edited or adjusted by the user. The user's editing ability is limited by the OEM access level given for each individual *Timer*. There are two dropdown menus to the right of the **View/Sort** label at the top of the **Timers** window, used for sorting.

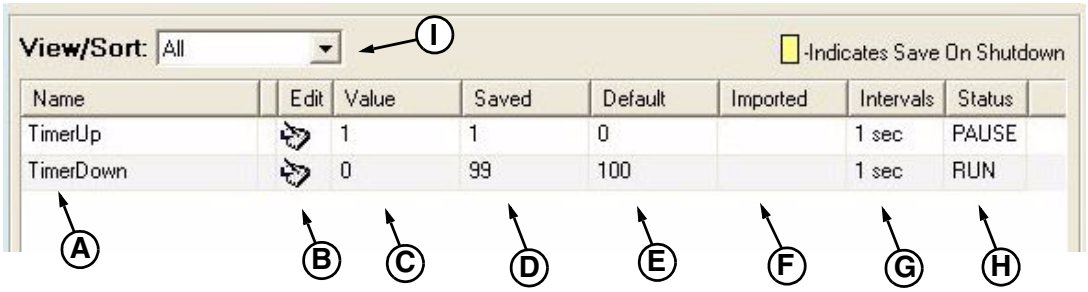


Figure 15

(A) Name Column

OEM defined *Name* of the *Timer*.

(B) Edit Column

This column is used to display the user's editing ability for each *Timer*. If a lock icon displays in this column, your OEM-supplied user settings do not allow you to edit this *Timer*.

(C) Value Column (Access Level Limited Only)

This column shows the actual *Timer* values that are being read by the Conductor. These are the values that are read from the temporary *EEPROMs* locations in memory. It is also the only column that can be edited or adjusted by the user. To enter a new *Value* for the active *Timer*, place the cursor in the Value window below and enter the new value and click the *SET* button (hitting the **"ENTER"** key will also place the cursor in the **Value** window).

(D) Saved Column

This column will display all values that are currently being stored in the processor's *EEPROM*.

(E) Default Column

This column will display the OEM-defined default *Timer* values and cannot be changed. All values in the *Value* column will be reset to the default values from this column when either the *Set to Defaults* or *Set ALL to Defaults* buttons are selected.

> ***IMPORTANT:*** *If you restore the OEM system to defaults, your system will return to an un-tuned state where all calibrations will be lost.*

(F) Imported Column

This column will display the *Timer* data that has been imported from a separate file.

(G) Intervals Column

OEM defined timed *Interval* that the *Timer* uses for timing data.

(H) Status Column

Displays the *Status* (RUN or PAUSE) of the *Timer*.

(I) View/Sort

See (D) View/Sort on page 12 for example (exception being that *Timers* cannot be sorted by Module, just Group).

Edit Individual Timers (Access Level Limited Only)

This part of the **Timers** window **(Figure 16)** is used to temporarily edit the *Value* of a specific *Timer*.

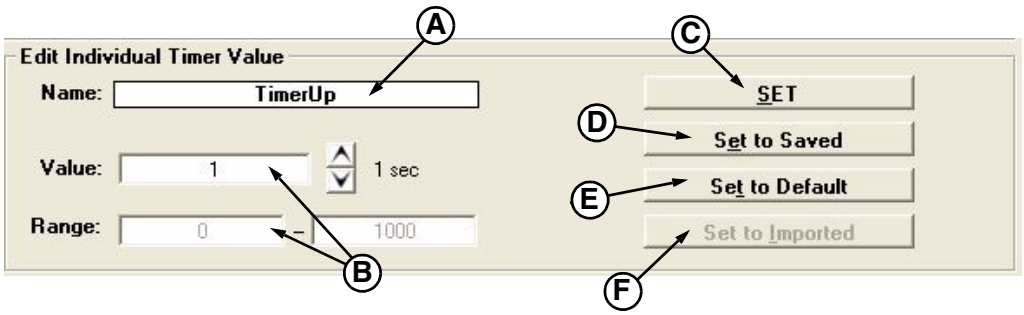


Figure 16

(A) Select Timer Heading

To activate all entry fields and buttons in this area, you must first select one of the *Timers* that are displayed in the **View Timers** window above this window. If entry fields and buttons remain grayed out after selecting a *Timer*, your OEM-supplied user settings do not allow you to use these features.

(B) Value and Range Fields

The *Value* field is the only active field that you can edit. Either type a new value in the open box or use the *Value Up* (**^**) or *Value Down* (**v**) button to change the setting in one unit increments. Click the *SET* button to enter the new values into the active *Timers Value* column. The *Range* label boxes are always grayed out and cannot be changed. The *Range* label boxes display the range of values that are allowed for the selected *Timers* settings.

(C) SET Button

Clicking this button will immediately enter the new *Value* adjustment made to the *Value* column of the active *Timer* selected. Clicking *SET* will only change the temporary memory location of this *Timer*.

Once a new value is entered into the *Value* column, it will cause the system to operate with the new *Value*. You can keep entering a new *Value* and *SET* it into the *Value* column as many times as necessary to achieve the desired result. Every time a new *Value* is entered, the system will run using the new values.

In this way, a system can be tweaked quickly without committing or saving the trial and error values. Once you are satisfied with the new *Value*, save the new settings by clicking the *Save ALL* button. If the new values are not saved, the next time the modules are reset the new values will be lost and the old saved values will be reloaded. Clicking *Save ALL* will change the processor's *EEPROM* memory location.

(D) Set to Saved Button

Clicking this button will immediately reset the *Value* column of the active *Timers* selected to the values that are displayed in the *Saved* column.

(E) Set to Default Button

Clicking this button will immediately reset the *Value* column of the active *Timers* selected to the values that are displayed in the *Default* column. **WARNING! MASTER MODULE OVERRIDE HAZARD. Whenever Timers values are reset to their default settings, the functionality of the OEM product system may be affected and cause unpredictable behavior. Death or serious injury can result.**

(F) Set to Imported Button

Clicking this button will immediately reset the *Value* column of the active *Timers* selected to the values that are displayed in the *Imported* column.

Edit All Writable Timers (Access Level Limited Only)

This part of the **Timers** window **(Figure 17)** is used to edit the values of all active writable *Timers* at once. If these four buttons remain grayed out after selecting a *Timer*, your OEM-supplied user settings do not allow you to use these features.

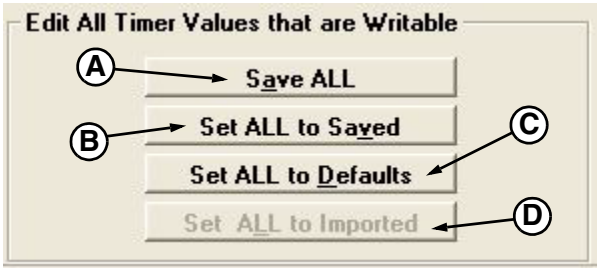


Figure 17

(A) Save ALL Button

Clicking this button will immediately enter the new *Value* adjustments made into the *Value* column of all active *Timers* and also changes the processor's EEPROM memory location. If the new values are not saved, the next time the modules are reset the new values will be lost and the old saved values will be reloaded.

(B) Set ALL to Saved Button

Clicking this button will immediately reset all active *Timer* values to the values that are displayed in the *Saved* column.

(C) Set ALL to Defaults Button

Clicking this button will immediately reset all active *Timer* values to the values that are displayed in the *Default* column. **WARNING! MASTER MODULE OVERRIDE HAZARD. Whenever Timers values are reset to their default settings, the functionality of the OEM product system may be affected and cause unpredictable behavior. Death or serious injury can result.**

(D) Set ALL to Imported Button

Clicking this button will immediately reset all active *Timer* values to the values that are displayed in the *Imported* column.

Timers Functions

This part of the **Timers** window **(Figure 18)** is used to import, export or print the values of all active *Timers*. If these two buttons remain grayed out after selecting a *Timer*, your OEM-supplied user settings do not allow you to use these features.

Figure 18

(A) Export to File Button

Clicking this button will automatically save the current *Timers* values to a file that will reside in the Conductor software folder. This file can be used later for reference or for importing these settings back into the Conductor.

> ***IMPORTANT:*** *Exporting to a file may cause communication problems between the Conductor and the module. It may be necessary to reconnect to the module after an Export to File action.*

(B) Import from File Button

Clicking this button will open a dialog box prompting the user to locate and select a previously saved *Timers* values file. Selecting this file will allow the Conductor to then read *Timers* values from the new file.

Timer Information

Timer information can be obtained by double-clicking on the *Timer* name. A separate information window will appear **(Figure 19)**.

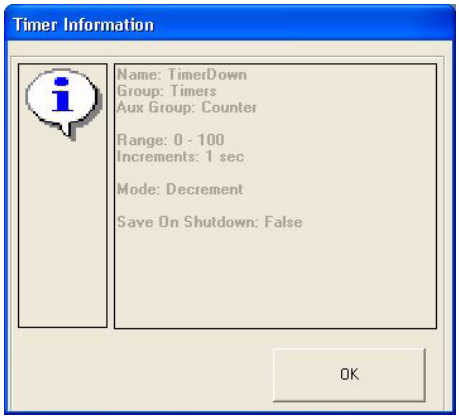


Figure 19

EEPROMS WINDOW

Description

When the **EEPROMs** function is selected, two separate windows will open: the **Danger** window **(Figure 20)** and the main **EEPROMs** window **(Figure 21)**.

DANGER
BEWARE, SERIOUS INJURY OR DEATH MAY RESULT FROM THE FOLLOWING:
1) DEBUGGING ANY DATA ITEM VALUE(S)
2) ALTERING ANY EEPROM OR TIMER VALUE(S)
3) MOVEMENT OF EQUIPMENT BY USE OF THIS TOOL.

Figure 20

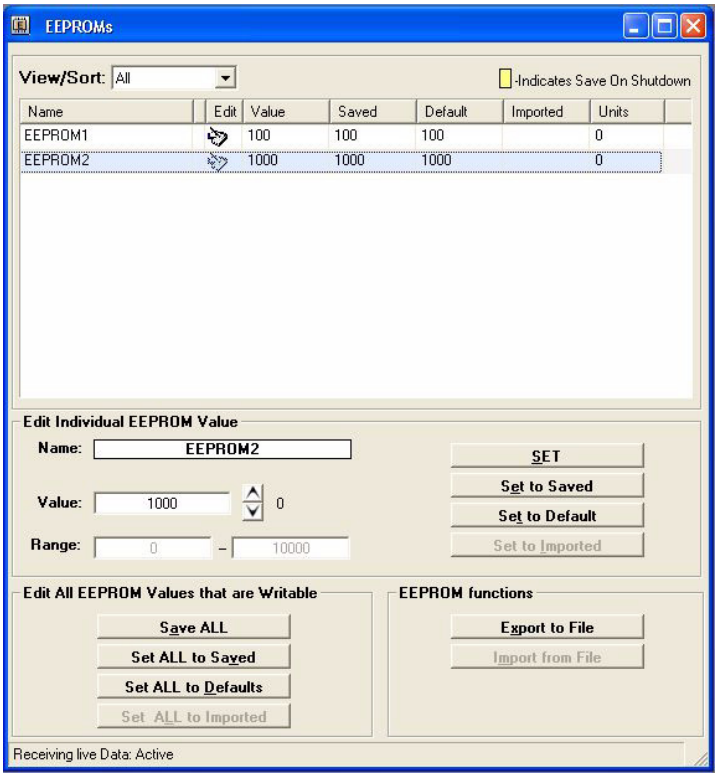


Figure 21

⚠ WARNING

MASTER MODULE OVERRIDE HAZARD

Whenever EEPROMs values are changed, the functionality of the system may be affected. Entering a wrong value may cause unpredictable OEM product behavior. Death or serious injury can result.

EEPROMs Window Features

View EEPROMs

This part of the **EEPROMs** window **(Figure 22)** lists eight columns *(Name, Save On Shutdown indication, Edit*, *Value*, *Saved*, *Default, Imported* and *Units)* of *EEPROM* settings installed on the OEM product. The *Value* column is the only column that can be edited or adjusted by the user. The user's editing ability is limited by your OEM access level given for each individual *EEPROM*. There are two dropdown menus to the right of the **View/Sort** label at the top of the **EEPROMs** window, used for sorting.

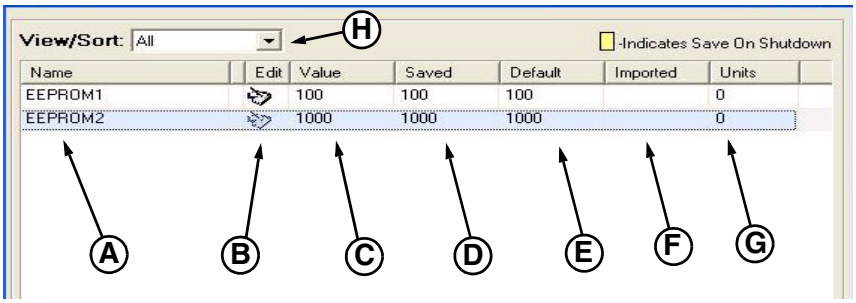


Figure 22

(A) Name Column

OEM-defined *Name* of the *EEPROMs*.

(B) Edit Column

This column is used to display the user's editing ability for each *EEPROM*. If a lock icon displays in this column, your OEM-supplied user settings do not allow you to edit this *EEPROM*.

(C) Value Column (Access Level Limited Only)

This column shows the actual *EEPROMs* values that are being read by the Conductor. These are the values that are read from the temporary *EEPROMs* locations in memory. It is also the only column that can be edited or adjusted by the user. To enter a new value for the active *EEPROM*, place the cursor in the **Value** window below, enter the new value and click the *SET* button (hitting the **"ENTER"** key will also place the cursor in the **Value** window).

(D) Saved Column

This column will display all values that are currently being stored in the processor's *EEPROM*.

(E) Default Column

This column will display the OEM-defined default *EEPROM* values and cannot be changed. All values in the *Value* column will be reset to the default values from this column when either the *Set to Defaults* or *Set ALL to Defaults* buttons are selected.

> ***IMPORTANT:*** *If you restore the OEM system to defaults, your system will return to an un-tuned state where all calibrations will be lost.*

(F) Imported Column

This column will display the *EEPROMs* data that has been imported from a separate file.

(G) Units Column

Displays the *Units* of the *EEPROMs*.

(H) View/Sort

See (D) View/Sort on page 12 for example (exception being that *EEPROMs* cannot be sorted by Module, just Group).

Edit Individual EEPROM Value (Access Level Limited Only)

This part of the **EEPROMs** window **(Figure 23)** is used to temporarily edit the *Value* of a specific *EEPROM*.

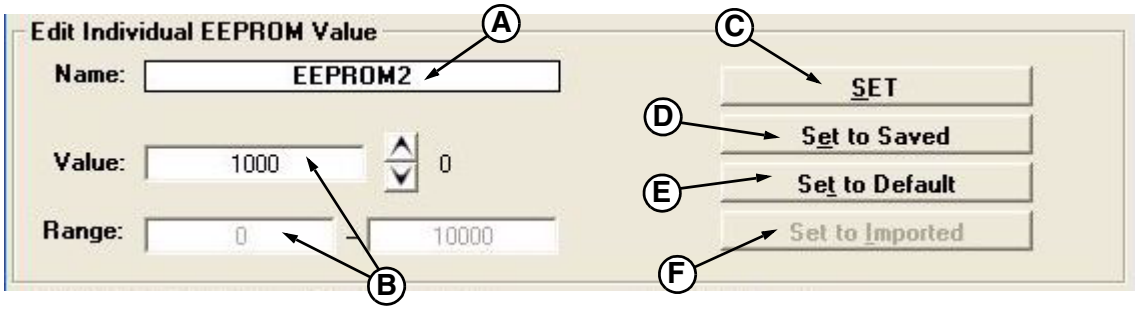


Figure 23

(A) Select EEPROM Heading

To activate all entry fields and buttons in this area, you must first select one of the *EEPROMs* that are displayed in the **View EEPROMs** window above this window. If entry fields and buttons remain grayed out after selecting an *EEPROM*, your OEM-supplied user settings do not allow you to use these features.

(B) Value and Range Fields

The *Value* field is the only active field that you can edit. Either type a new value in the open box or use the *Value Up* (**^**) or *Value Down* (**v**) button to change the setting in one unit increments. Click the *SET* button to enter the new values into the active *EEPROMs Value* column. The *Range* label boxes are always grayed out and cannot be changed. The *Range* label boxes display the range of values that are allowed for the selected *EEPROM* settings.

(C) SET Button

Clicking this button will immediately enter the new *Value* adjustment made to the *Value* column of the active *EEPROM* selected. Clicking *SET* will only change the temporary memory location of this *EEPROM*.

Once a new value is entered into the *Value* column, it will cause the system to operate with the new *Value*. You can keep entering a new *Value* and *SET* it into the *Value* column as many times as necessary to achieve the desired result. Every time a new *Value* is entered, the system will run using the new values.

In this way, a system can be tweaked quickly without committing or saving the trial and error values. Once you are satisfied with the new *Value*, save the new settings by clicking the *Save ALL* button. If the new values are not saved, the next time the modules are reset the new values will be lost and the old saved values will be reloaded. Clicking *Save ALL* will change the processor's *EEPROM* memory location.

(D) Set to Saved Button

Clicking this button will immediately reset the *Value* column, of the active *EEPROMs* selected to the values that are displayed in the *Saved* column.

(E) Set to Default Button

Clicking this button will immediately reset the *Value* column of the active *EEPROMs* selected to the values that are displayed in the *Default* column. **WARNING! MASTER MODULE OVERRIDE HAZARD. Whenever EEPROMs values are reset to their default settings, the functionality of the OEM product system may be affected and cause unpredictable behavior. Death or serious injury can result.**

(F) Set to Imported Button

Clicking this button will immediately reset the *Value* column of the active *EEPROMs* selected to the values that are displayed in the *Imported* column.

Edit All EEPROM Values that are Writable (Access Level Limited Only)

This part of the **EEPROMs** window **(Figure 24)** is used to edit the values of all active writable *EEPROMs* at once. If these four buttons remain grayed out after selecting an *EEPROM*, your OEM-supplied user settings do not allow you to use these features.

Figure 24

(A) Save ALL Button

Clicking this button will immediately enter the new *Value* adjustments made into the *Value* column of all active *EEPROMs* and also changes the processor's *EEPROM* memory location. If the new values are not saved, the next time the modules are reset the new values will be lost and the old saved values will be reloaded.

(B) Set ALL to Saved Button

Clicking this button will immediately reset all active *EEPROM* values to the values that are displayed in the *Saved* column.

(C) Set ALL to Defaults Button

During system development, a set of "best guess" values for each *EEPROM* is determined and used for factory defaults. The values are nominal and are intended as a basis from which to start the tuning process. At times, should the tuning process go awry, click this button to return all values in the *Value* column to the *Default* settings.

Clicking this button will immediately reset all active *EEPROM* values to the values that are displayed in the *Default* column. **WARNING! MASTER MODULE OVERRIDE HAZARD. Whenever EEPROMs values are reset to their default settings, the functionality of the OEM product system may be affected and cause unpredictable behavior. Death or serious injury can result.**

(D) Set ALL to Imported Button

Clicking this button will immediately reset all active *EEPROM* values to the values that are displayed in the *Imported* column.

EEPROM Functions

This part of the **EEPROMs** window **(Figure 25)** is used to import, export or print the values of all active *EEPROMs*. If these two buttons remain grayed out after selecting an *EEPROM*, your OEM-supplied user settings do not allow you to use these features.

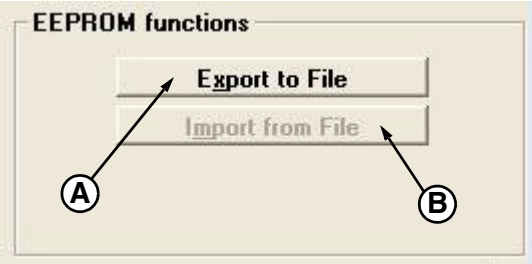


Figure 25

(A) Export to File Button

Clicking this button will automatically save the current *EEPROMs* values to a file that will reside in the Conductor software folder. This file can be used later for reference or for importing these settings back into the Conductor.

> ***IMPORTANT:*** *Exporting to a file may cause communication problems between the Conductor and the module. It may be necessary to reconnect to the module after an Export to File action.*

(B) Import from File Button

Clicking this button will open a dialog box prompting the user to locate and select a previously saved *EEPROMs* values file. Selecting this file will allow the Conductor to then read *EEPROMs* values from the new file.

EEPROM Information

EEPROM information can be obtained by double-clicking on the *EEPROM* name. A separate information window will appear **(Figure 26)**.

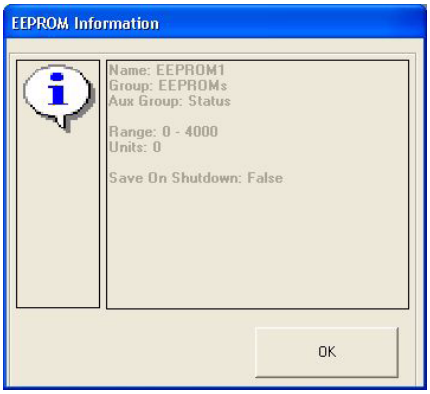


Figure 26

WATCH WINDOW

Description

The **Watch** window works best for large systems with many *Inputs*, *Outputs*, *Variables*, etc., where it is inconvenient to monitor several *Data Items* simultaneously within their respective data windows. In the **Watch** window, the user will be able to select up to 20 *Memory Locations* of *Data Items* to "watch." The Master Module that is selected for the project will determine the number of *Memory Locations* for *Data Items* that are available to "watch." *Data Items* take one or two *Memory Locations* based on their configuration at design time. As *Data Items* are added to the **Watch** window, notice that the *Memory Used* bar indicates how much memory has been used **(Figure 28, J)**.

Access

View Watch Window Button

Clicking this button will open the **Watch** window **(Figure 27, A**). The **Watch** window can also be opened from the **Main** window *View* menu by selecting **Watch** (Key Command Shortcut - Ctrl-W) from the dropdown menu **(Figure 27, B**).

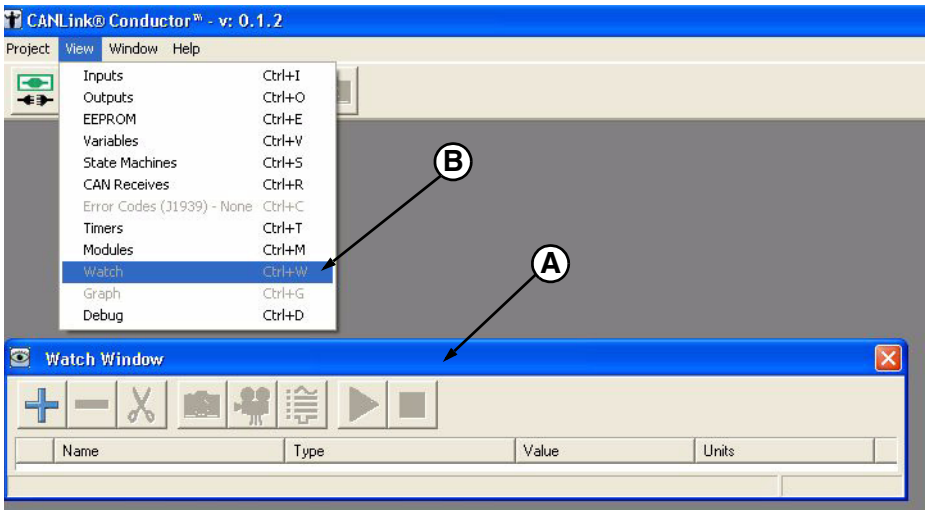


Figure 27

Controls

ADD Button

Clicking the *ADD* button **(Figure 28, A)** opens the **Multi View** window **(Figure 28, B),** which will allow the user to select from a list of *Data Item*s **(Figure 28, C)** to add to the **Watch** window. The **Multi View** window also allows the user to select the *Sub-Types* **(Figure 28, D)** for *Data Item*s such as *Outputs*, *Timers* and *CAN Receives*.

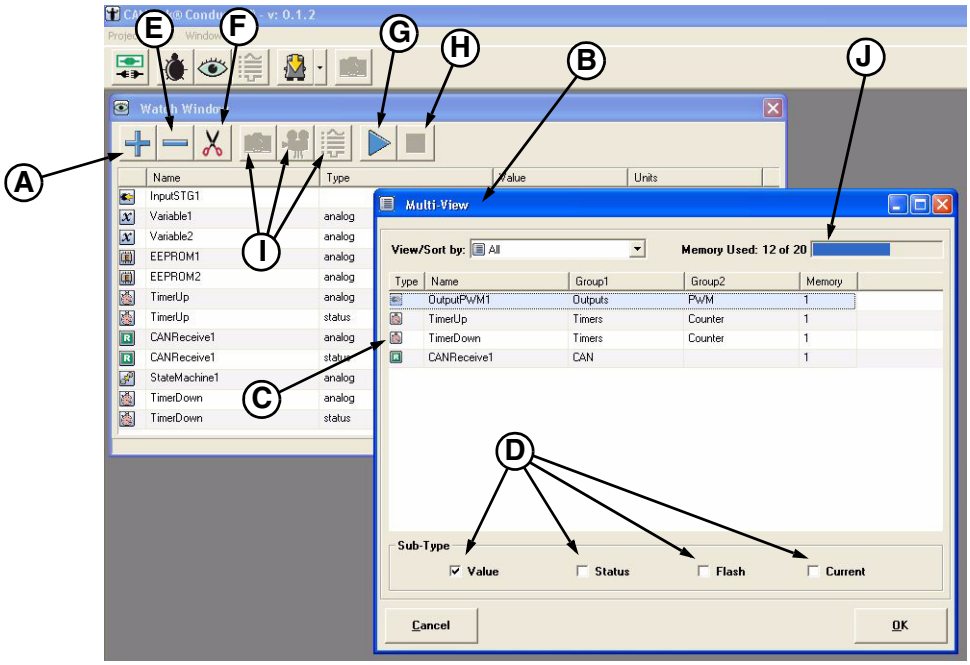


Figure 28

DELETE Button

Clicking the *DELETE* button **(Figure 28, E)** will allow the user to delete an individual *Data Item* from the **Watch** window list.

Un-Assign Button

Clicking the *Un-assign* button **(Figure 28, F)** will allow the user to remove <u>all</u> *Data Items* from the **Watch** window with one button push.

> ***IMPORTANT:*** *Before you click this button, make sure you want to remove <u>all</u> Data Items from the* ***Watch*** *window list, as there is no "undo."*

RUN Button

Clicking the *RUN* button **(Figure 28, G)** will request that the Master Module send data to the Conductor about the active *Data Items* in the **Watch** window list. The user will then be able to view "real-time" values from all active *Data Items*.

STOP Button

Clicking the *STOP* button **(Figure 28, H)** will request that the Master Module stop updating the "real-time" values for those active *Data Items* in the **Watch** window list.

Note: With this release of the Conductor software, the ***Snapshot, Record*** *and* ***Graph*** *menu choices* **(Figure 28, I)** *are not active features and will remain grayed out.*

Multi View Window Features

(A) View/Sort by: Dropdown Menu

Allows the *Data Items* to be sorted and displayed in different ways. *All* will display every *Data Item* type. Any other selection will display only the *Data Item* type chosen.

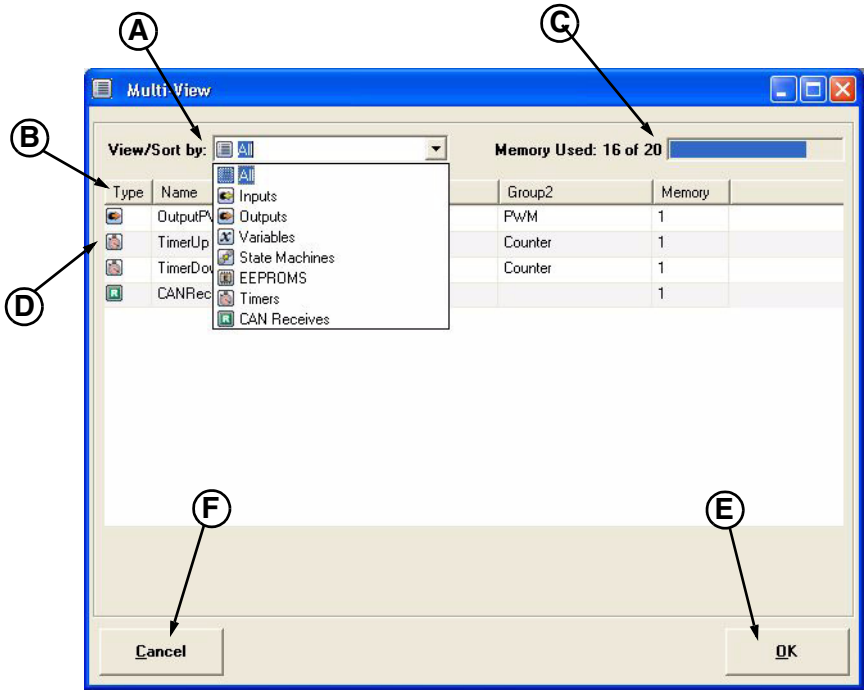


Figure 29

(B) Data Properties (Type, Name, Group1, Group2, Memory)

Displays the *Data Items* that are currently selected in the *View/Sort by:* dropdown menu. It also displays the *Data Items* that are still available to be added to the **Watch** window.

(C) Memory Used

This displays the memory used in a blue progress bar and also lists the total number of *Data Items* that have already been added to the **Watch** window. The maximum number of *Data Items* that can be added to the **Watch** window is 20.

(D) Data Item Type Icon

This is an icon that gives quick visual reference to the type of *Data Item* in that line, e.g., *Inputs*, *Outputs*, *Variables*, *State Machines*, *EEPROMs*, *Timers* and *CAN Receives*.

(E) OK Button

This button is only active after a *Data Item* has been selected from the **Multi View** window list. Either selecting the *Data Item* and clicking *OK* or double-clicking the *Data Item* will close the window and add the *Data Item* to the **Watch** window.

(F) Cancel Button

Clicking this button will close the **Multi View** window without adding anything further to the **Watch** window.

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Debug

DEBUG WINDOW

Description

When the **Debug** function is selected, two separate windows will open. The **Danger** window **(Figure 1)** and the main **Debug** window **(Figure 2)**.

DANGER
BEWARE, SERIOUS INJURY OR DEATH MAY RESULT FROM THE FOLLOWING:
1) DEBUGGING ANY DATA ITEM VALUE(S)
2) ALTERING ANY EEPROM OR TIMER VALUE(S)
3) MOVEMENT OF EQUIPMENT BY USE OF THIS TOOL.

Figure 1

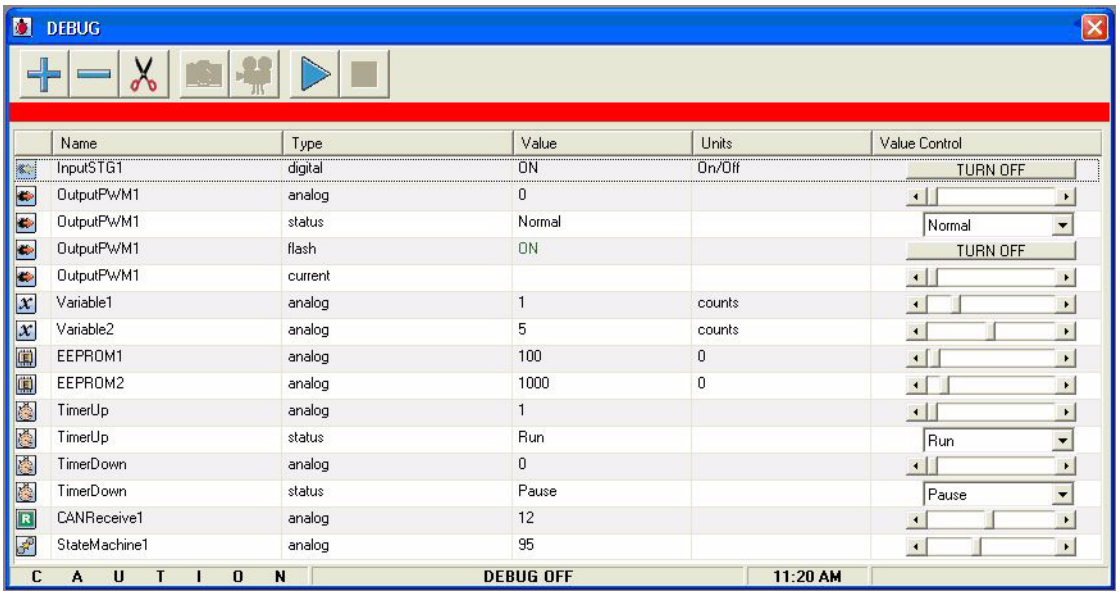


Figure 2

⚠ WARNING

MASTER MODULE OVERRIDE HAZARD

Whenever Debug is activated, you are assuming direct control of selected *Data Item's* value and potentially bypassing safety interlocks and normal operation. Entering a wrong value may cause unpredictable OEM product behavior. Death or serious injury can result.

In the **Debug** window, the user will be able to select up to 20 *Data Items* to "debug." The Master Module that is selected for the project will determine the number of *Data Items* that are available to "debug." It allows for artificial manipulation of *Inputs*, *Outputs*, *Variables*, *EEPROMs*, *Timers*, *CAN Receives* and *State Machines*. The window will display *Name Type*, *Value*, *Units* and *Value Control* of all *Data Items* added to the **Debug** window.

Access

View Debug Window Button

Clicking this button will open the **Debug** window **(Figure 3, A)**. The **Debug** window can also be opened from the **Main** window View menu by selecting **Debug** (Key Command Shortcut - Ctrl-D) from the dropdown menu **(Figure 3, B)**.

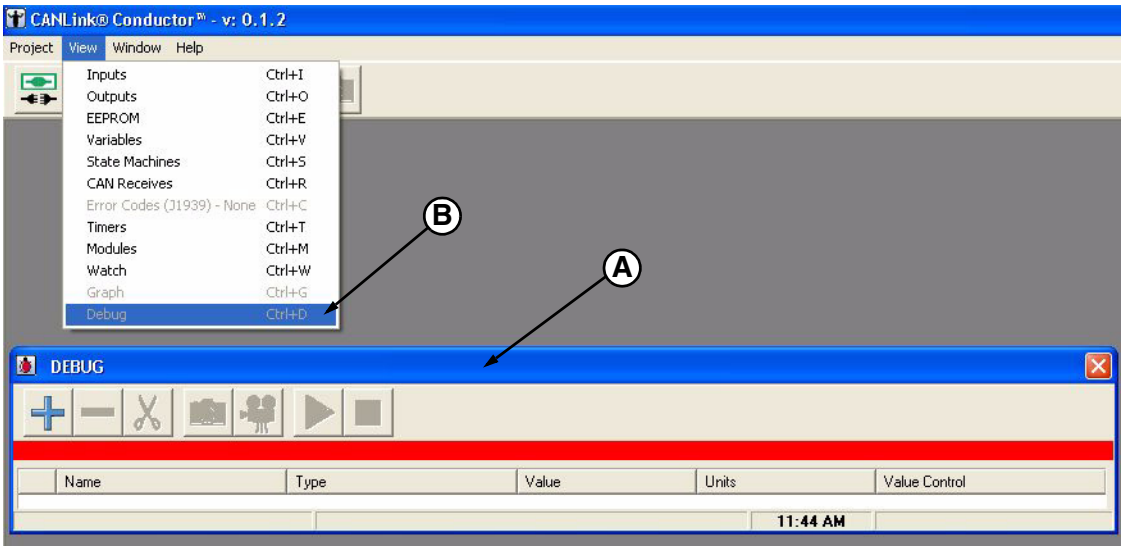


Figure 3

Controls

ADD Button

Clicking the *ADD* button **(Figure 4, A)** opens the **Multi View** window **(Figure 4, B),** which will allow the user to select from a list of *Data Items* **(Figure 4, C)** to add to the **Debug** window. The **Multi View** window also allows the user to select the *Sub-Types* **(Figure 4, D)** for *Data Items* such as *Outputs*, *Timers* and *CAN Receives*.

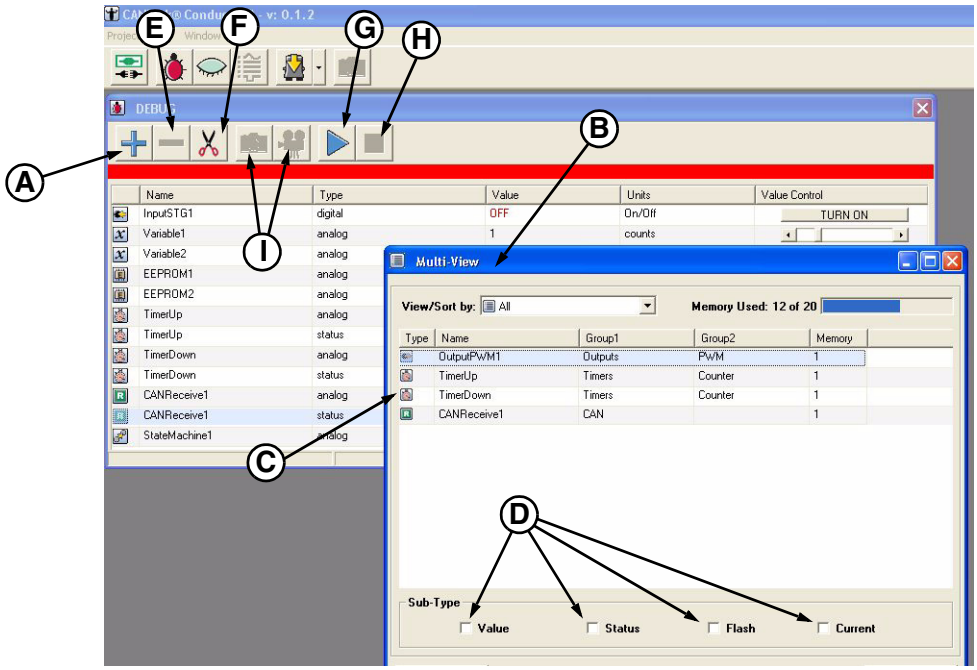


Figure 4

DELETE Button

Clicking the *DELETE* button **(Figure 4, E)** will allow the user to delete an individual *Data Item* from the **Debug** window list.

Un-Assign Button

Clicking the *Un-Assign* button **(Figure 4, F)** will allow the user to remove <u>all</u> *Data Items* from the **Debug** window with one button push.

> ***IMPORTANT:*** *Before you click this button, make sure you want to remove <u>all</u> Data Items from the* **Debug** *window list, as there is no "undo."*

RUN Button

Clicking the *RUN* button **(Figure 4, G)** will request that the Master Module send current data to the Conductor about the active *Data Items* in the **Debug** window list. The user will then be able to:

- Turn specific *Data Items* ON or OFF
- Adjust “real-time” values from all active *Data Items*
- Run or Pause *Timers*
- Clear or Receive data from CAN bus
- Apply hypothetical conditions to *Outputs* (*Open*, *Short GND*, *Short BATT*, *OverCurrent*, *Grounded*, *STB or Open*, *Under/Over Volt*, *Over Temp* and *STG or Open*)

STOP Button

Clicking the *STOP* button **(Figure 4, H)** will request that the Master Module stop updating the “real-time” values for those active *Data Items* in the **Watch** window list.

*Note: With this release of the Conductor software, the **Snapshot** and **Record** menu choices **(Figure 4, I)** are not active features and will remain grayed out.*

Multi View Window Features

(A) View/Sort by: Dropdown Menu

This dropdown menu allows the *Data Items* to be sorted and displayed in different ways. *All* will display every *Data Item* type. Any other selection will display only the *Data Item* type chosen.

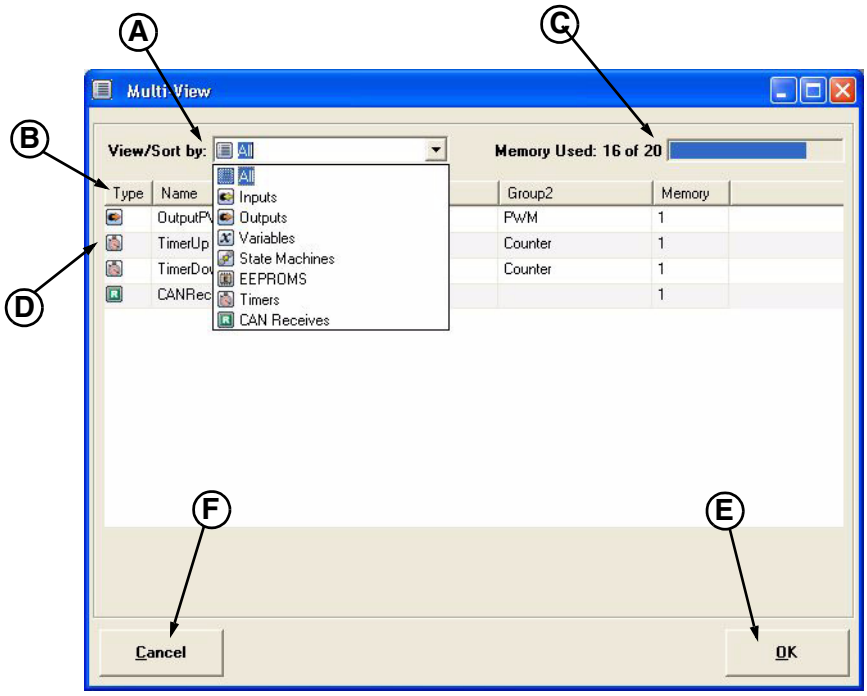


Figure 5

(B) Data Properties (Type, Name, Group1, Group2, Memory)

Displays the *Data Items* that are currently selected in the *View/Sort by:* dropdown menu. It also displays the *Data Items* that are still available to be added to the **Debug** window.

(C) Memory Used

This displays the memory used in a blue progress bar and also lists the total number of *Data Items* that have already been added to the **Debug** window. The maximum number of *Data Items* that can be added to the **Debug** window is 20.

(D) Data Item Type Icon

This is an icon that gives quick visual reference to the type of *Data Item* in that line, e.g., *Inputs*, *Outputs*, *Variables*, *State Machines*, *EEPROMs*, *Timers* and *CAN Receives*.

(E) OK Button

This button is only active after a *Data Item* has been selected from the **Multi View** window list. Either selecting the *Data Item* and clicking OK or double-clicking the *Data Item* will close the window and add the *Data Item* to the **Debug** window.

(F) Cancel Button

Clicking this button will close the **Multi View** window without adding anything further to the **Debug** window.

DEBUG DATA ITEM TYPES

Input Type

Inputs typically provide run-time information to the Master Module of the OEM products system. The process for debugging *Input* type *Data Items* is essentially all the same. *Input* types that are currently supported by the Conductor are:

- Inputs
- Variables
- State Machines
- EEPROMs
- Timers
- CAN Receives

For all *Input* types, the **Debug** window will display information on the *Name*, *Type*, *Value*, *Units*, and *Value Control*. Three of these columns are identical to what you would see in the *Data Items* data window (*Name*, *Value*, *Units*) and are described in the Data Windows section of this manual. *See Data Windows on page 11*.

The *Type* and *Value Control* columns however, are new. There are two "*Types*" that can appear; they are "analog" or "digital" **(Figure 6, A)**. If an *Input* is digital, the control field will display a *TURN ON or TURN OFF* button **(Figure 6, B)**. If it is analog, the control field will display a scroll bar **(Figure 6, C)**. When the *Scroll Bar* button is moved, to change the state of the *Data Item*, the new value will also be displayed in the bottom right cell of the **Debug** window ***(Figure 6, D)***.

> ***IMPORTANT:*** *Make all initial Input Value Control* ***(Figure 6, E)*** *adjustments* ***before*** *entering the* ***Debug*** *mode. At this point the center cell at the bottom of the* ***Debug*** *window should read* ***DEBUG OFF (Figure 6, F)****.*

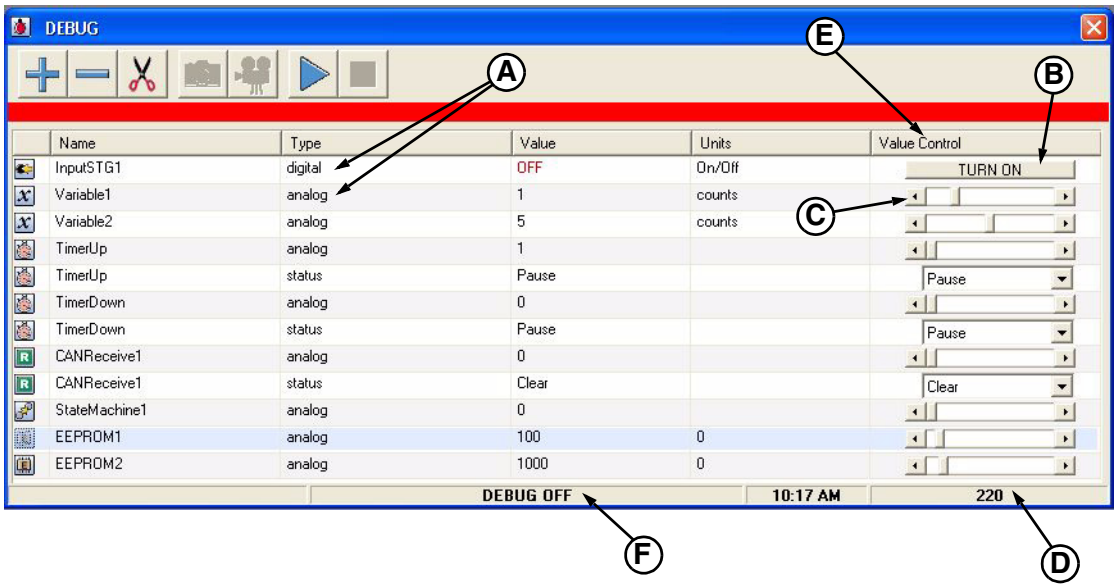


Figure 6

Output Type

Outputs typically provide read/write value information to and from the Master Module of the OEM products system. The process for debugging an *Output* type is more complicated than debugging *Inputs*. The complexity comes into play when considering four different *Sub-Type* options for debugging *Outputs*. These *Sub-Types* are *Value*, *Status*, *Flash* and *Current* **(Figure 7, A)**.

Output Sub-Type options are selected in the **Multi-View** window. *See Controls on page 35*. These *Sub-Types* will be based on whether the *Output* has been set up for *Output Status*, *Output Flash* or *Current Feedback*, and/or your level of access privileges to the Conductor software. Check-boxes for any *Sub-Type* that are grayed out mean that the *Sub-Type* is not available.

Once all *Outputs* and *Sub-Type* options have been selected, adjusting *Value Control* **(Figure 7, B)** is basically the same as adjusting an *Input Data Item*. If an *Output* is digital, the control field will display a *TURN ON or TURN OFF* button **(Figure 7, C)**. If it is analog, the control field will display a scroll bar **(Figure 7, D)**. When the *Scroll Bar* button is moved, to change the state of the *Data Item*, the new value will be displayed in the bottom right cell of the **Debug** window **(Figure 7, E)**.

Status type *Outputs* also allow the user to apply hypothetical conditions to *Output Data Items* **(Figure 7, F)** (*Open*, *Short GND*, *Short BATT*, *OverCurrent*, *Grounded*, *STB or Open*, *Under/Over Volt*, *Over Temp* and *STG or Open*).

> ***IMPORTANT:*** *Make all initial Output Value Control* ***(Figure 7, B)*** *adjustments* ***before*** *entering the* ***Debug*** *mode. At this point, the center cell at the bottom of the* ***Debug*** *window should read* ***DEBUG OFF (Figure 7, G)****.*

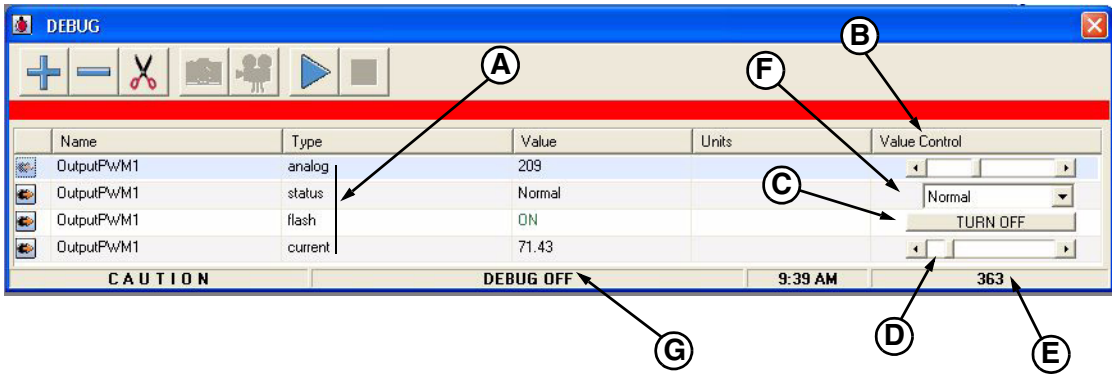


Figure 7

DEBUG MODE

Once all desired *Data Items* have been selected and added to the **Debug** window, the **Debug** session can begin.

⚠ WARNING

MASTER MODULE OVERRIDE HAZARD

Whenever Debug is activated, you are assuming direct control of selected *Data Item* values and potentially bypassing safety interlocks and normal operation. Entering a wrong value may cause unpredictable OEM product behavior. Death or serious injury can result.

Remember that at any time that the Conductor software is connected to an OEM product, the *Emergency Stop (E-STOP) - Safe Mode* can be activated one of two ways.

- Depressing the computer keyboard **"SPACEBAR"**
- Disconnecting the communication cable between the computer and the product Master Module

1. Clicking the *RUN* button will start the **Debug** session.
2. The "**Potential DANGER**" **Hazard** window **(Figure 8, A)** will be prominently displayed and the bottom left cell of the **Debug** window will show a "**CAUTION**" animation **(Figure 8, B)** as a reminder of the potential severity of making any major *Data Item* overrides. The center cell of the **Debug** window will also change to "**DEBUG ON**" **(Figure 8, C)** to indicate that you are in **Debug** mode.
3. You can now make careful adjustments to any *Data Item* in the **Debug** window by selecting a *Data Item* **(Figure 8, D)** and using the controls in the *Value Control* column **(Figure 8, E)** to make the desired adjustment. Pay close attention to how the *Data Item* adjustment impacts control of the OEM product. If the product ever begins to act in an unpredictable or unexpected manner, **IMMEDIATELY** press the keyboard "**SPACEBAR**" to enter the *Emergency Stop (E-STOP) - Safe Mode.*
4. After all diagnostic troubleshooting has been completed and all *Data Items* have been adjusted, click the *STOP* button to end the **Debug** session.

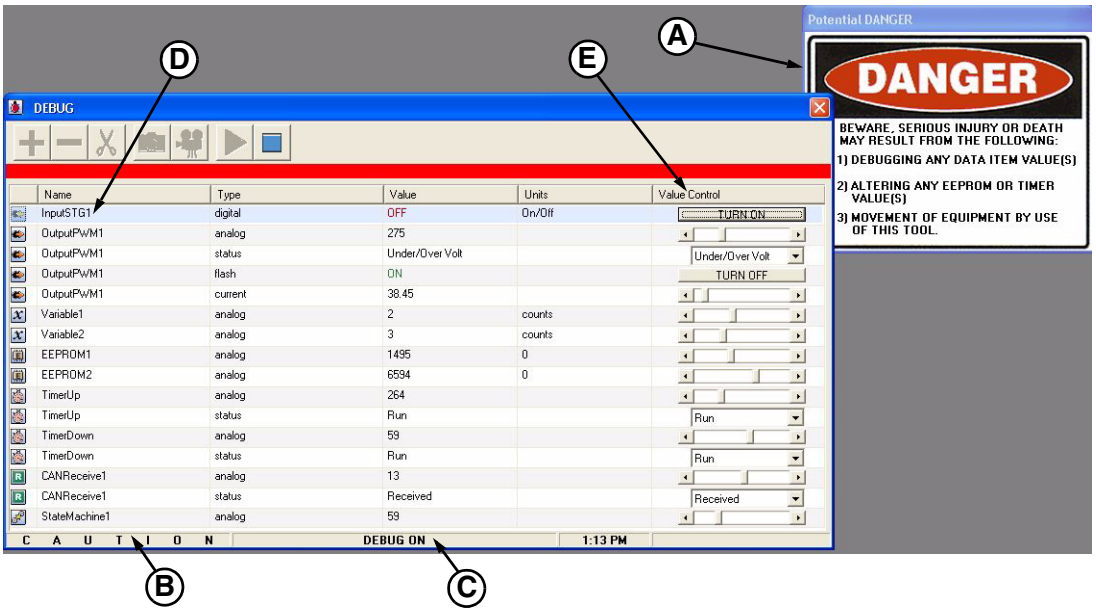


Figure 8

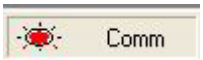
Misc. Conductor

FAQ'S

1. **Why doesn't the Conductor connect with my equipment's system?**
   - Check for proper connection between the Master Module and the PC.
   - Verify that you are selecting the correct .IOc file configured for your system.
   - Check for adequate power supplied to the Master Module on your system.

2. **How can I verify that the Conductor is communicating with my equipment's system?**
   - Check that the *Connect/Disconnect* button shows connected.

     Connected
   - Check that the red *Comm* icon is flashing in the status bar at the bottom of the **Main** window.

3. **Some features are not available in my Conductor software. Why?**
   - Your password does not allow access to those features.
   - The system was not configured to allow those features.
   - This software release does not support these features at this time.

4. **How can I obtain new/change passwords, obtain a new .IOc file or change access levels?**

   Contact the Original Equipment Manufacturer (OEM) for assistance.

Company Information

ADDRESS

HED (Hydro Electronic Devices, Inc.)
2120 Constitution Ave.
Hartford, WI 53207

WEB SITE

www.hedonline.com

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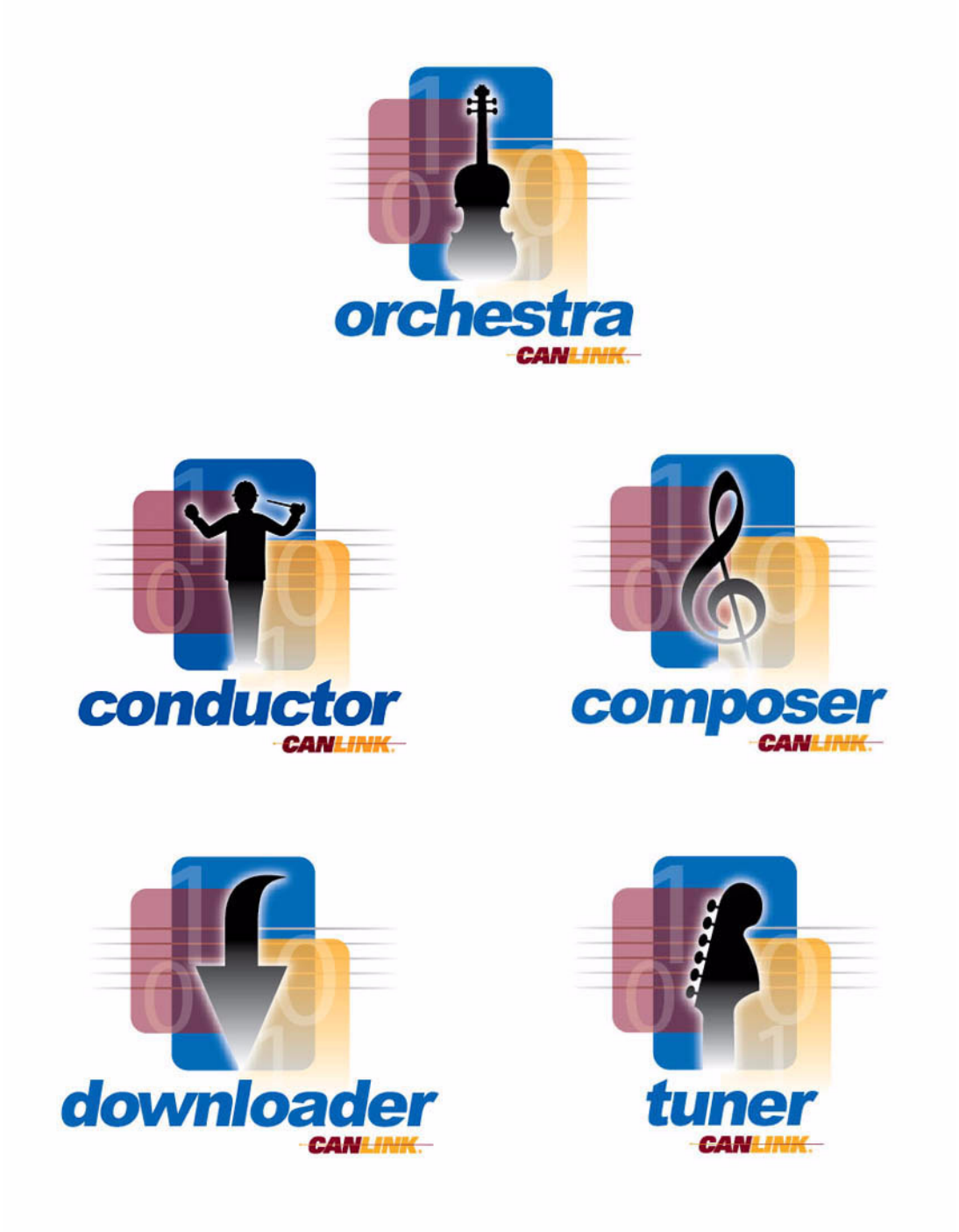
CANLink Software Products



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